World Health Organization

WHO biosafety guidelines for handling of SARS specimens

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The following biosafety guidelines have been prepared by WHO for handling clinical specimens associated with SARS.

SARS specimens should be handled according to appropriate biosafety practices in order to avoid laboratory-related infections and spread of disease to close contacts. As the primary route of infection is thought to be via droplets, extreme caution must be exercised to eliminate the unguarded production of aerosols. Detailed information about containment facilities and biosafety practices recommended in this document may be found in the WHO Laboratory Biosafety Manual, 2nd revised edition, available from the WHO web site. According to the latest findings, the etiologic agent responsible for the syndrome is a previously unknown coronavirus, currently called SARS coronavirus, or SARS-CoV. Accordingly, all laboratory work practices should be appropriate for work with viral agents, with particular emphasis on potential spread by droplets, air, and/or contaminated surfaces and objects. No procedure should be undertaken in which there is any doubt about the ability to adequately contain the specimen and prevent the uncontrolled release of the virus.

WHO biosafety guidelines for handling SARS clinical specimens and materials derived from laboratory investigations of SARS:

The following activities may be performed in biosafety level 2 (BSL-2) facilities with appropriate BSL-2 work practices:

- Routine diagnostic testing of serum and blood samples
- Manipulations involving known inactivated (lysed, fixed or otherwise treated) virus particles and/or incomplete, non-infectious portions of the viral genome
- Routine examination of mycotic and bacterial cultures.
- Final packaging of specimens for transport to diagnostic laboratories for additional testing. Specimens should already be in a sealed, decontaminated primary container

The following precautions are strongly recommended by WHO for work in BSL-2 laboratories with potential SARS specimens:

- Any procedure that may generate aerosols should be performed in a biological safety cabinet.
- Laboratory workers should wear protective equipment, including disposable gloves, solid-front or wrap-around gowns with cuffed sleeves, eye protection and a surgical mask, or full-face shield, according to the risk of aerosols and exposure when performing specific manipulations. When working at a biological safety cabinet, a full face shield is not necessary.
- Centrifugation of human specimens should be performed using sealed centrifuge rotors or sample cups. These rotors or cups should be unloaded in a biological safety cabinet.
- Procedures performed outside of a biological safety cabinet should be performed in a manner that minimizes the risk of exposure to an inadvertent release of the etiologic agent.
- Work surfaces and equipment should be decontaminated after specimens are processed. Standard decontamination agents that are effective against lipid-enveloped viruses should be sufficient.
- Biological waste should be treated as outlined in the WHO Laboratory Biosafety Manual, 2nd revised edition

which renders viral particles inactive.

In cases where laboratory facilities are marginal, consideration should be given to referral of specimens to a suitably equipped reference laboratory for primary diagnostic tests.

The following activities require BSL-3 facilities and BSL-3 work practices.

- Viral cell culture of the etiologic agent.
- Manipulations involving growth or concentration of the etiologic agent.

When a procedure or process cannot be conducted within a biological safety cabinet, then appropriate combinations of personal protective equipment (e.g., respirators, face shields) and physical containment devices (e.g., centrifuge safety cups or sealed rotors) **must** be used.

The following activities require Animal BSL-3 facilities and Animal BSL-3 work practices:

- Inoculation of animals for potential recovery of the agent from SARS samples.
- Any protocol involving animal inoculation for confirmation and/or characterization of putative SARS agents.

Transport of human specimens:

Transport of specimens within national borders should comply with current national regulations.

International air transport of human specimens from suspect or probable SARS cases must follow the current (2003) edition of the International Air Transport Association (IATA) Dangerous Goods Regulations.

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- Consignment of diagnostic specimens 2003

Current IATA regulations (2003) allow specimens known or suspected of containing the SARS agent to be transported as UN 3373 “Diagnostic Specimens” when they are transported for diagnostic or investigational purposes.

Specimens transported for any other purposes must be transported as UN 2814, and marked as: “Infectious substance, affecting humans (Severe Acute Respiratory Syndrome virus)”.

Cultures prepared for the deliberate generation of pathogens may not be transported as diagnostic specimens, but as UN 2814, Infectious Substance, affecting humans (Severe Acute Respiratory Syndrome virus).

All specimens to be transported (UN 3373 or UN 2814) must be packaged in triple packaging consisting of three packaging layers:

UN 3373, Diagnostic Specimens, shall be packed in good quality packagings, which shall be strong enough to withstand the shocks and loads normally encountered during transport. Packagings shall be constructed and closed so as to prevent any loss of contents that might be caused under normal conditions of transport, by vibration or by changes in temperature, humidity or pressure.

Primary receptacles shall be packed in secondary packagings in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings shall be placed in a final outer package with suitable cushioning material. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material or of the outer packaging.

For Liquids
The primary receptacle(s) shall be leakproof and shall not contain more than 500 mI. There shall be absorbent material placed between the primary receptacle and the secondary packaging; if several fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them. The absorbent material shall be in sufficient quantity to absorb the entire contents of the primary receptacles and there shall be a secondary packaging which shall be leakproof. The primary receptacle or the secondary packaging shall be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa (0.95 bar). The outer packaging shall not contain more than 4 litres.

For Solids
The primary receptacle(s) shall be siftproof and shall not contain more than 500 g. If several fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them and there shall be a secondary packaging which shall be leakproof. The outer packaging shall not contain more than 4 kg.

For air transport, the smallest overall external dimension of a completed package must be at least 10 cm.

Packaging must conform to certain performance standards.

For further information about definitions, packaging requirements, markings and labels, accompanying documentation, and refrigerants, please refer to the competent authority, current IATA shipping guidelines, commercial packaging suppliers, or available courier companies.